PART I

Chapter 1.1 EXECUTIVE SUMMARY

The 2004 305(b) and 303(d) Integrated Report describes the water quality conditions in the Commonwealth of Virginia during the time period beginning January 1, 1998 through December 31, 2002. The primary purpose of this report is to satisfy the water quality reporting requirements of the Commonwealth of Virginia under Sections 305(b), 303(d), 106, 314 and 319 of the Federal Clean Water Act and the Virginia Water Quality Monitoring, Information and Restoration Act.

Virginia has nine major river basins with an estimated 50,537 miles of perennial rivers and streams and approximately 2,557 square miles of estuaries. These figures were calculated utilizing the Environmental Protection Agency (EPA) National Hydrography Database (NHD). This new and improved hydrography database has provided additional geographical refinement of rivers, streams, lakes and estuarine waters in Virginia. This is the reason that the overall stream mileage in the state has slightly increased from previous reported stream mileage calculation.

The overall water quality for Virginia is assessed based on whether or not the condition of the waterbody being assessed permits citizens to safely enjoy the designated uses of the waters as described in the Virginia Water Quality Standards. Table 1.1-1 briefly describes the designated uses and the baseline criteria used in this assessment to demonstrate support of the designated uses.

Table 1.1-1 DESIGNATED USE MATRIX

NO.	DESIGNATED USE	SUPPORT OF USE DEMONSTRATED BY
1	Aquatic Life Use	Conventional Pollutants (Dissolved Oxygen, pH, Temp.); Toxic contaminants in water column; Nutrients and toxic contaminants found in sediments exceeding NOAA's Effects Range -Median Value; Biological evaluation.
2	Fish Consumption Use	Advisories, limiting consumption, or restrictions issued by Virginia Department of Health (VDH); Comparison of fish tissue data to state screening values for toxic pollutants found in Tables 6(a) and 6(b) of the Water Quality Assessment Guidance Manual
3	Shellfish Consumption Use	Restrictive actions for harvesting and marketing of shellfish resources made by Div. of Shellfish Sanitation of VDH.
4	Swimming Use	Conventional Pollutant (Fecal Coliform Bacteria) and/or beach closures issued by VDH
5	Public Water Supply Use	Closures or advisories by VDH; comparison of data to applicable public water supply standards
6	Wildlife Use	Aquatic life toxics criteria in water column

Types of Data Used in Assessment

The assessment begins by analyzing all QA/QC approved data from DEQ ambient water quality, biological, sediment and fish tissue monitoring, other special studies and/or other non-DEQ water quality data for the 5-year assessment period. The results of these comprehensive data analyses are compared to both numeric and narrative criteria related to the designated uses contained in the Water Quality Standards (WQS). The WQS are provisions of State and/or Federal regulations that contain numeric and/or narrative criteria for protecting the designated uses of all waters in the Commonwealth.

There are two basic types of water quality data used in the assessment process. The first type of data is QA/QC approved “monitored” data. This data comes from the collection and analysis of chemical, biological, and/or physical samples taken by DEQ and/or any other DEQ approved data submitted during the reporting period. These data are considered the highest quality data. Normally, the 303(d) Impaired Waters list is

comprised of only QA/QC approved monitored data due to the assessment confidence associated with the QA/QC monitoring requirements. Monitored data is obtained using EPA accepted methods and DEQ approved protocols. All non-DEQ monitoring submittals, except USGS chemical data submittals, must provide a sampling and analysis protocol and all field data for review. If data discrepancies or other suspect information is generated, a field verification audit will be conducted by DEQ monitoring staff. Partially approved monitoring data can be used to signify waters as insufficient but having observed effects where normal assessment methodologies show degradation and are will be prioritized for follow up monitoring (Category 3C). Partially approved monitoring data, where normal assessment methodology show fully supporting results, are considered insufficient data with low priority for follow up monitoring (Category 3D). These data could include results from water quality test kits or other alternate biological methodologies that do not provide the quality assured accuracy needed to confirm Water Quality Standards exceedences but can provide an accurate indication of good water quality or other observed effects.

The second type of data used in the assessment is considered "evaluated" data. These physical, chemical and/or biological data are primarily obtained from sources where there is not an EPA accepted sampling protocol and/or DEQ non-approved sampling and analysis protocols. These data are considered to be of lower quality with little confidence in their results and normally are not used directly for listing waters as impaired or having observed effects. Segments, where lower quality data indicate chronic and recurring water quality degradation, may be designated as insufficient but having observed effects on water quality for associated individual designated uses on a case by case basis. Additional DEQ monitoring efforts should be targeted for these waters as resources allow. Additionally, waters that were on previous 303d lists but do not have any additional monitoring data for the 2004 assessment period will reflect the results of the previous assessment for the associated designated uses.

The following approval process will be used for non-DEQ "monitored" data protocol and QA/QC procedure review:

All ancillary data that have been received and reviewed by DEQ and found acceptable should be used for 305(b) and 303(d) assessment. The data are from two categories, state/federal agencies (other than DEQ) and the Citizen Monitoring Program. The approval process for data from the Citizen Monitoring Program is addressed in Part VI, Section 6.3.1 of the 2004 Assessment Guidance Manual. The following addresses the approval process for data from state and federal agencies.

All "monitored" chemical and biological data must be supported by EPA accepted monitoring protocols. QA/QC procedures must also be reviewed and approved by DEQ. As regional assessment staff becomes aware of data sources, those parties generating data for DEQ 305b/303d assessment consideration should be requested by the regional assessment staff to submit QA/QC plans, standard operating procedures (SOPs), and monitoring procedures to the DEQ 305(b) Coordinator. The 305(b) Coordinator will provide copies of supporting documentation for chemical data to QA/QC review staff in the Water Quality Monitoring and Assessment (WQMA) program and provide copies of all supporting documentation for biological monitoring of freshwater benthic macroinvertebrates to the Water Quality Standards staff.

The DEQ staff does not consider any non-agency free-flowing biological monitoring data other than benthic macroinvertebrate. Benthic information from non-DEQ sources may be independently assessed by regional biologists to determine their acceptability for 305(b) assessment purposes on an individual basis. Copies of the supporting documentation for freshwater benthic data should be provided to the regional offices where the surveyed sites are located for review by the regional biologists. The regional biologists are most familiar with the various ecoregions in the state and are knowledgeable with what constitutes appropriate reference sites, conditions or benthic metrics that are acceptable for assessing streams in these ecoregions. The regional biologists in consultation with the biological coordinator should review the sampling and analysis methodology and if practical or necessary, the available data and make a determination regarding the acceptability of the data for assessing the benthic community. The regional biologists will provide any comments or requests for additional information directly to the data generators and will copy such communications to the DEQ biological coordinator. Copies of the review results shall be distributed to the regional assessment staff and the DEQ 305(b) Coordinator. If the protocols involve estuarine toxics data and/or biological assessments in tidal environments, supporting documents should be provided to and reviewed by the Chesapeake Bay Program staff.

All comments concerning toxics data, chemical (SOPs) and/or QA/QC plans will be coordinated through the Water Quality Monitoring and Assessment (WQMA) QA/QC coordinator. WQMA QA/QC coordinator is responsible for providing comments to data generators and DEQ 305(b) Coordinator concerning the acceptability of SOPs and QA/QC documentation for chemical data.

If a chemical, biological or tidal waters data package cannot be used in the assessment process, the appropriate DEQ staff will provide the data generator an explanation for the data not being useable. A list of all data providers and the status of the QA/QC review will be included in Appendix D of the 2004 Integrated Report.

Assessment Method Used in This Report

The overall goal of the assessment program is to properly identify problem waters and then to design and implement a water quality management plan to return these waters to their designated uses.

The assessment approach used in this report begins by comparing monitoring data against the regulatory standard for each parameter. DEQ has incorporated the Integrated Reporting guidance EPA developed in 2003 into the 2004 assessment. It is substantially different from previous assessments and is designed to integrate or combine the 305b overall assessment of Virginia's waters and separate out those waters impaired and needing a TMDL as per 303(d). The EPA 2004 Integrated Report guidance and Assessment Database (ADB V2.1) has 5 different categories with 1 category having 3 subcategories in which every segment or "assessment unit" (AU) will be placed. The US EPA Integrated Report guidance allows the states to subdivide the federal Categories in order to address state programmatic needs.

Below are the US EPA defined Categories followed by associated Virginia defined subcategories**:**

FULLY SUPPORTING – Waters are supporting one or more designated uses

- **EPA Category 1**: Attaining all associated designated uses and no designated use is threatened.

- **EPA Category 2**: Some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met.

  Va. Category 2A - waters are attaining all of the uses for which they are monitored and there is insufficient data to document the attainment of all uses.

  Va. Category 2B – waters are of concern to the state but no Water Quality Standard exists for a specific pollutant, or the water exceeds a state screening value. These waters are considered fully supporting with observed effects.

INDETERMINATE – Waters needing additional information

- **EPA Category 3**: Insufficient data to determine whether any designated uses are met

  Va. Category 3A - no data are available within the data window of the current assessment to determine if any designated use is attained and the water was not previously listed as impaired.

  Va. Category 3B - some data exists but is insufficient to determine attainment of designated uses. Such waters will be a prioritized for follow up monitoring.

  Va. Category 3C- data collected by a citizen monitoring or other organization indicating water quality problems may exist but the methodology and/or data quality has not been approved for a determination of attainment of designated uses. These waters are considered as having insufficient data with observed effects. Such waters will be a prioritized for follow up monitoring.

  Va. Category 3D – data collected by a citizen monitoring or other organization indicate that designated uses are attained however the methodology and/or data quality has not been approved for such a determination.

IMPAIRED – Waters are impaired or threatened but a TMDL is not needed.

- **EPA Category 4A**: impaired or threatened for one or more designated uses but does not require a TMDL because the TMDL for specific pollutant(s) is complete and US EPA approved.

- **EPA Category 4B**: impaired or threatened for one or more designated uses but does not require the development of a TMDL because other pollution control requirements (such as VPDES limits with a compliance schedule) are reasonably expected to result in attainment of the Water Quality Standard by the next reporting period or permit cycle.

- **EPA Category 4C**: impaired or threatened for one or more designated uses but does not require a TMDL because the impairment is not caused by a pollutant and/or is determined to be caused by natural conditions.

IMPAIRED – requiring a TMDL

- **EPA Category 5**: **Waters are impaired or threatened and a TMDL is needed.**

  Va. Category 5A - the Water Quality Standard is not attained. The AU is impaired for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).

  Va. Category 5B –the Water Quality Standard for shellfish use is not attained. One or more pollutants remain requiring TMDL development.

  Va. Category 5C – the Water Quality Standard is not attained due to suspected natural conditions. The AU is impaired for one or more designated uses by a pollutant(s) and may require a TMDL (303d list). Standards for these waters may be re-evaluated due to the effects of natural conditions.

  Va. Category 5D - the Water Quality Standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants remain requiring TMDL development.

  Va. Category 5E – effluent limited water is not expected to meet compliance schedules by next permit cycle or reporting period.

In order to properly assess water quality data several factors need to be considered.

1. Because environmental conditions vary, it is possible that monitoring data may violate a water quality standard without signaling a significant environmental problem causing the loss of designated uses. Consequently, while some measurements might violate water quality standards, a low violation rate is an insufficient reason to classify a stream as failing its designated use. The assessment challenge is to interpret the limited amount of sample data available to determine whether an observed violation of standards warrants classifying a segment as not fully supporting its designated uses. The water quality samples taken can be affected by both human activity and/or natural/background conditions.

2. There are certain acceptable tolerances for violations. For example, an occasional violation of the dissolved oxygen standard, even if caused by human activity may not be critical to the aquatic environment.

3. Measurement errors in the analysis of the samples collected could be yet another reason why the numeric standard might appear to be violated in a sample.

In performing the assessment of chemical data summarized in this report, DEQ used the EPA Percent Method with a slight modification for small datasets. For additional information on the methodologies used in the assessment, see Chapter 2.2 of this report.

Results – Rivers and Streams

This report presents the results of the assessment of water quality in approximately 13,218 (26.2%) of the total 50,537 miles of the state's free-flowing streams and rivers for which sufficient data was available to assess at least some designated uses. The remaining stream miles were evaluated as insufficient data to determine if designated uses are being met.

Table 1.1-2 presents the results of the 2004 assessment for the river miles assessed.

Table 1.1-2 Assessment Results for Rivers

Degree of Use Support	**Water Type**	**Total Miles** *(Rounded to the Nearest Whole Number*	**(%)**
Fully Support All Designated Uses **(EPA Category 1)**	River (mi)	2,197	4.3%
Fully Support Some Uses but Insufficient Data to Assess All Uses **(EPA Category 2)**	River (mi)	4,128	8.2%
Virginia Subcategory 2A		2,808	
Virginia Subcategory 2B		1,318	
Insufficient Data to Determine if any Uses are Being Met **(EPA Category 3)**	River (mi)	37,319	73.8%
Virginia Subcategory 3A		36,790	
Virginia Subcategory 3B		157	
Virginia Subcategory 3C		159	
Virginia Subcategory 3D		213	
Waters are Impaired but do not Need a TMDL **(EPA Category 4)**	River (mi)	593	1.2%
EPA Subcategory 4A		589	
EPA Subcategory 4B		0	
EPA Subcategory 4C		5	
Waters are Impaired and Need aTMDL **(EPA Category 5)**	River (mi)	6,301	12.5%
Virginia Subcategory 5A		5,316	
Virginia Subcategory 5B		0	
Virginia Subcategory 5C		922	
Virginia Subcategory 5D		63	
Virginia Subcategory 5E		0	
Total Size	River (mi)	50,537	100%

Unlike previous reports, the "fully supporting but threatened" category has not been used. For 2004, Virginia will not declare any waters as threatened due to the inability to "predict" impairment as per the EPA definition of threatened waters. Instead, Virginia has used the "observed effects" classification found in Category 2 or 3 for waters that may indicate water quality problems. These assessments are based on evaluated and/or other related data; especially those associated with nonpoint source impacts. See Chapter 2.2 for additional information on the determination of waters with observed effects. As part of the ongoing assessment process, follow-up monitoring of these waters with observed effects as resources allow should provide better, more conclusive data for future assessments.

The leading cause of impairment of designated uses in Virginia's rivers and streams is violation of the bacteria standards. Virginia has recently adopted 3 new bacteria criteria including fecal coliform, E. coli and enterococci. See 9 VAC 25-260-170 for additional information on these new criteria. Agricultural practices appear to be one of the primary sources contributing to the bacteria standards violations. However, urban runoff, leaking sanitary sewers, failing septic tanks, domestic animals and even wildlife can be significant contributing sources.

Results – Lakes and Reservoirs

Virginia has 100 significant (public water supply and/or > 100 acres), publicly owned lakes and reservoirs with an estimated 120,751 total acres. The total acres are less than previous reports due to the reduction in size of Virginia's portion of Kerr Reservoir and Lake Gaston. Previously, North Carolina's portion of these reservoirs was included in the total size of these two reservoirs. For 2004, 108,742 (90.0%) acres were monitored and assessed

with sufficient data for at least some designated uses. The remaining acres were evaluated as insufficient data to determine if any designated uses are being met.

Table 1.1-3 presents the results from the 2004 assessment of lakes and reservoirs.

Table 1.1-3 Assessment Results for Lakes/Reservoirs

Degree of Use Support	**Water Type**	**Total Miles** *(Rounded to the Nearest Whole Number*	**(%)**
Fully Support All Designated Uses **(EPA Category 1)**	Lakes (acres)	10,633	8.8%
Fully Support Some Uses but Insufficient Data to Assess All Uses **(EPA Category 2)**	Lakes (acres)	8,213	6.8%
Virginia Subcategory 2A		8,108	
Virginia Subcategory 2B		105	
Insufficient Data to Determine if any Uses are Being Met **(EPA Category 3)**	Lakes (acres)	12,009	9.9%
Virginia Subcategory 3A		7,697	
Virginia Subcategory 3B		0	
Virginia Subcategory 3C		3,636	
Virginia Subcategory 3D		676	
Waters are Impaired but do not Need a TMDL **(EPA Category 4)**	Lakes (acres)	24,596	20.4%
EPA Subcategory 4A		180	
EPA Subcategory 4B		0	
EPA Subcategory 4C		24,416	
Waters are Impaired and Need aTMDL **(EPA Category 5)**	Lakes (acres)	65,300	54.1%
Virginia Subcategory 5A		60,753	
Virginia Subcategory 5B		0	
Virginia Subcategory 5C		4,546	
Virginia Subcategory 5D		0	
Virginia Subcategory 5E		0	
Total Size	Lakes (acres)	120,751	100%

Many of these waters were not fully supporting for aquatic life use, primarily due to natural stratification in the lakes causing dissolved oxygen depletion. Also, exceedences of the fish tissue standard for PCB was a major cause of fish consumption use impairment in lakes and reservoirs.

Results – Tidal Estuaries

This report presents the water quality assessment results of Virginia's tidal estuaries. The following table presents the results of the assessment of Virginia's designated uses.

Table 1.1-4 presents the assessment category results from the 2004 assessment of tidal estuaries. Sufficient data was available for assessment of at least some designated uses in 2,533 (99.1%) square miles of the total 2,557square miles of estuarine waters. The remaining square miles were assessed as insufficient data to determine if any designated uses were being met.

Table 1.1-4 Assessment Results for Estuarine Waters

Degree of Use Support	Water Type	Total Miles *(Rounded to the Nearest Whole Number*	(%)
Fully Support All Designated Uses **(EPA Category 1)**	Estuary (sq. mi.)	303	11.8%
Fully Support Some Uses but Insufficient Data to Assess All Uses **(EPA Category 2)**	Estuary (sq. mi.)	420	16.4%
Virginia Subcategory 2A		369	
Virginia Subcategory 2B		51	
Insufficient Data to Determine if any Uses are Being Met **(EPA Category 3)**	Estuary (sq. mi.)	24	0.9%
Virginia Subcategory 3A		24	
Virginia Subcategory 3B		0	
Virginia Subcategory 3C		0	
Virginia Subcategory 3D		0	
Waters are Impaired but do not Need a TMDL **(EPA Category 4)**	Estuary (sq. mi.)	0	0%
EPA Subcategory 4A		0	
EPA Subcategory 4B		0	
EPA Subcategory 4C		0	
Waters are Impaired and Need aTMDL **(EPA Category 5)**	Estuary (sq. mi.)	1,810	70.8%
Virginia Subcategory 5A		1,752	
Virginia Subcategory 5B		39	
Virginia Subcategory 5C		19	
Virginia Subcategory 5D		0	
Virginia Subcategory 5E		0	
Total Size	Estuary (sq. mi.)	2,557	100%

The leading cause of impairment in Virginia's estuarine waters is violation of the Dissolved Oxygen Standard associated with aquatic life use. Another leading cause of impairment is violations of the fecal coliform bacteria standard associated with shellfish consumption advisories.

Based on limited available information, all of Virginia's 120 miles of the Atlantic Ocean Coastal Waters were evaluated as fully supporting Virginia's designated uses.